

(b) For class DOT-106A tanks, the wall thickness of the cylindrical portion of the tank shall not be less than that specified in §179.301 and shall be such that at the tank test pressure the maximum fiber stress in the wall of the tank will not exceed 15,750 p.s.i. as calculated by the following formula:

$$s = [p(1.3D^2 + 0.4d^2) / (D^2 - d^2)]$$

where:

$d$  = inside diameter in inches;  
 $D$  = outside diameter in inches;  
 $p$  = tank test pressure in psig;  
 $s$  = wall stress in psig

(c) If plates are clad with material having tensile strength at least equal to the base plate, the cladding may be considered a part of the base plate when determining the thickness. If cladding material does not have tensile strength at least equal to the base plate, the base plate alone shall meet the thickness requirements.

[29 FR 18995, Dec. 29, 1964, as amended by Order 71, 31 FR 9083, July 1, 1966. Redesignated at 32 FR 5606, Apr. 5, 1967; 66 FR 45186, 45390, Aug. 28, 2001]

#### § 179.300-7 Materials.

(a) Steel plate material used to fabricate tanks must conform with the following specifications with the indicated minimum tensile strength and elongation in the welded condition. However, the maximum allowable carbon content for carbon steel must not exceed 0.31 percent, although the individual ASTM specification may allow for a greater amount of carbon. The plates may be clad with other approved materials:

Specifications <sup>2</sup>	Tensile strength (psi) welded condition <sup>1</sup> (minimum)	Elongation in 2 inches (percent) welded condition <sup>1</sup> (longitudinal) (minimum)
ASTM A 240/A 240M type 304	75,000	25
ASTM A 240/A 240M type 304L	70,000	25
ASTM A 240/A 240M type 316	75,000	25
ASTM A 240/A 240M type 316L	70,000	25
ASTM A 240/A 240M type 321	75,000	25
ASTM A 285 Gr. A	45,000	29
ASTM A 285 Gr. B	50,000	20
ASTM A 285 Gr. C	55,000	20
ASTM A 515/A 515M Gr. 65	65,000	20
ASTM A 515/A 515M Gr. 70	70,000	20
ASTM A 516/A 516M Gr. 70	70,000	20

<sup>1</sup> Maximum stresses to be used in calculations.

<sup>2</sup> These specifications are incorporated by reference (IBR, see § 171.7 of this subchapter.)

(b) [Reserved]

(c) All plates must have their heat number and the name or brand of the manufacturer legibly stamped on them at the rolling mill.

[Amdt. 179-10, 36 FR 21355, Nov. 6, 1971, as amended by Amdt. 179-42, 54 FR 38798, Sept. 20, 1989; Amdt. 179-43, 55 FR 27642, July 5, 1990; Amdt. 179-52, 61 FR 28682, June 5, 1996; Amdt. 179-52, 61 FR 50255, Sept. 25, 1996; Amdt. 179-53, 61 FR 51342, Oct. 1, 1996; 68 FR 75763, Dec. 31, 2003]

#### § 179.300-8 Tank heads.

(a) Class DOT-110A tanks shall have fusion-welded heads formed concave to pressure. Heads for fusion welding shall be an ellipsoid of revolution 2:1 ratio of major to minor axis. They shall be one piece, hot formed in one heat so as to provide a straight flange at least 1½ inches long. The thickness shall not be less than that calculated by the following formula:

$$t = \frac{Pd}{2SE}$$

where symbols are as defined in §179.300-6(a).

(b) Class DOT-106A tanks must have forged-welded heads, formed convex to pressure. Heads for forge welding must be torispherical with an inside radius not greater than the inside diameter of the shell. They must be one piece, hot formed in one heat so as to provide a straight flange at least 4 inches long. They must have snug drive fit into the shell for forge welding. The wall thickness after forming must be sufficient to meet the test requirements of §179.300-16 and to provide for adequate threading of openings.

[29 FR 18995, Dec. 29, 1964. Redesignated at 32 FR 5606, Apr. 5, 1967, and amended by Amdt. 179-10, 36 FR 21355, Nov. 6, 1971]

#### § 179.300-9 Welding.

(a) Longitudinal joints must be fusion welded. Head-to-shell joints must be forge welded on class DOT-106A tanks and fusion welded on class DOT-110A tanks. Welding procedures, welders and fabricators must be approved in accordance with AAR Specifications for Tank Cars, appendix W (IBR, see § 171.7 of this subchapter).

(b) Fusion-welded joints must be in compliance with the requirements of